

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Use of Spectrum Bands Above 24 GHz for)	GN Docket No. 14-177
Mobile Radio Services)	
)	
Establishing a More Flexible Framework to)	IB Docket No. 15-256
Facilitate Satellite Operations in the 27.5-)	
28.35 GHz and 37.5-40 GHz Bands)	
)	
Petition for Rulemaking of the Fixed Wireless)	RM-11664
Communications Coalition to Create Service)	
Rules for the 42-43.5 GHz Band)	
)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90,)	WT Docket No. 10-112
95, and 101 To Establish Uniform License)	
Renewal, Discontinuance of Operation, and)	
Geographic Partitioning and Spectrum)	
Disaggregation Rules and Policies for Certain)	
Wireless Radio Services)	
)	IB Docket No. 97-95
Allocation and Designation of Spectrum for)	
Fixed-Satellite Services in the 37.5-38.5 GHz,)	
40.5-41.5 GHz and 48.2-50.2 GHz Frequency)	
Bands; Allocation of Spectrum to Upgrade)	
Fixed and Mobile Allocations in the 40.5-42.5)	
GHz Frequency Band; Allocation of Spectrum)	
in the 46.9-47.0 GHz Frequency Band for)	
Wireless Services; and Allocation of)	
Spectrum in the 37.0-38.0 GHz and 40.0-40.5)	
GHz for Government Operations)	

**COMMENTS OF O3B LIMITED ON FURTHER NOTICE OF PROPOSED
RULEMAKING**

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**COMMENTS OF O3B LIMITED ON FURTHER NOTICE OF PROPOSED
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O3b Limited (“O3b”) submits these comments in response to the Further Notice of Proposed Rulemaking in this proceeding.¹

¹ *Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, GN Docket No. 14-177, *et al.*, Report and Order and Further Notice of Proposed Rulemaking, FCC 16-89 (rel. July 14, 2016) (“*Further Notice*” or “*Report and Order*”).

I. INTRODUCTION AND SUMMARY

The mmWave bands are the core bands for a growing range of high capacity satellite services. These new satellite services are provided by new systems that are continually expanding in capacity, capability and spectrum efficiency. O3b uses the mmWave bands to provide high capacity, low-latency, fiber-like broadband service. O3b offers an alternative to terrestrial capacity, but also provides mobile backhaul to terrestrial operators, allowing them to provide service where backhaul is otherwise not available. O3b also provides high capacity, low latency service in use cases (including ships and offshore oil rigs) where terrestrial options are impractical or simply impossible to provide. And O3b, like all FSS operators, provides service in an environment of intensive intra-service sharing with other FSS systems that use the same spectrum to serve the same geographic areas.

The *Further Notice* proposes a number of rule changes that could have a significant impact on O3b's operations. Our comments address the proposal to rework the 47.2 – 50.2 GHz band ("the 47 GHz Band") and the proposal to eliminate the FSS primary allocation and to permit "use-or-share" access to unserved portions of Upper Microwave Flexible Use Service ("UMFUS") license areas.

The 47 GHz Band. Access for traditional gateways to all three gigahertz of spectrum in the 47 GHz Band is critically important to O3b's future growth. The Commission should not adopt rule changes that would prevent O3b and other FSS operators from having reasonable, flexible, and primary/protected access to three gigahertz of spectrum for traditional FSS gateways and at least two gigahertz for other individually licensed earth stations.

The *Further Notice* proposes to further restrict FSS use of the 47.2 – 48.2 GHz band and to open the 48.2 – 50.2 GHz band to UMFUS. Two of the three scenarios proposed for opening the 48.2 – 50.2 GHz band – band segmentation and first-come licensing – would significantly

reduce the utility of this band for individually licensed earth stations. But either is better than the proposal to relegate FSS to opportunistic use. Doing so would make this band essentially useless to FSS for provision of service.

The *Further Notice* also proposed to apply the overly stringent earth station siting approach the Commission adopted for the 28 GHz band to the 47 GHz Band, but limit the number of potential sites to a twentieth of the number permitted in the 28 GHz band. NGSO FSS operators need far greater earth station siting flexibility than what is afforded by the GSO-centric 28 GHz siting rules. O3b needs practical access to the 47.2 – 48.2 band and significant siting flexibility at least in the 48.2 – 50.2 GHz band.

Use-or-Share. The *Further Notice* proposes to permit non-UMFUS access to the 28 GHz band in areas in which the UMFUS licensee does not use the spectrum. O3b agrees that UMFUS licensees' right to exclude other users should sunset after a reasonable buildout period. Use-or-share access should be limited to FSS earth stations until the impact of aggregate interference on FSS satellites from UMFUS operations is better understood.

If the Commission authorizes non-FSS use-or-share access it should emphasize that FSS has priority over all other newly permitted services in the 28 GHz band. This is consistent with the Commission's decades-old treatment of FSS as secondary only to LMDS (now UMFUS), which status the Commission re-affirmed in the *Report and Order*. The Commission should also adopt restrictions to prevent additional interference to satellites from other terrestrial uses. Any other users, licensed or unlicensed, must be subject to immediate mitigation (including shutdown) following an interference event.

II. DISCUSSION

A. The 47GHz Band

The Commission's *First V-Band Order*² designated the 48.2-50.2 GHz portion of the 47 GHz Band for Fixed-Satellite Services ("FSS") use, and the 47.2-48.2 GHz portion for wireless use. The Commission's *Second V-Band Order* allowed coordinated FSS gateways to share the 47.2-48.2 GHz band with wireless services.³ In accordance with the U.S. band plan, O3b has long planned to use the entire 47 GHz Band for gateways to support growth of its global system beyond the capacity it can provide with beams in the available Ka-band spectrum – and well before the Commission's decisions in the *Report and Order*. O3b's carrier and enterprise customers also require earth stations that can be sited where needed and can operate with the certainty of primary status. Through a series of policy changes and new rules the *Report and Order* greatly restricts the extent of future FSS use of the 28 GHz Ka-band in the United States. These changes have significantly elevated the importance of the 47 GHz Band to O3b for high capacity, individually licensed earth stations used to support fiber-like connectivity for its U.S. operations.

² *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations*, First Report and Order, 13 FCC Rcd 24649, 24651 ¶¶ 2, 15, & 31 (1999) ("First V-Band Order"). In the *First V-Band Order*, the Commission designated the 48.2-50.2 GHz band for primary FSS uplink services.

³ *Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz Frequency Band; Allocation of Spectrum in the 46.9-47.0 GHz Frequency Band for Wireless Services; and Allocation of Spectrum in the 37.0-38.0 GHz and 40.0-40.5 GHz for Government Operations*, Second Report and Order, ¶ 17 (2003) ("Second V-Band Order"). The *Second V-Band Order* allowed "gateway operations in 47.2-48.2 GHz FSS (Earth-to-space) band provided that the earth station downlink operations are also coordinated for use in the 37.5-40.0 GHz band."

1. O3b Needs Access to the Entire 47 GHz Band for Gateways

The *Further Notice* proposes to open the entire three GHz of the 47 GHz Band, including the 48.2-50.2 GHz portion that has long been designated for FSS (Earth-to-space) primary use, to primary fixed and mobile operations under the Part 30 UMFUS rules.⁴ It also entertains proposals that would eliminate the ability for FSS to use the 48.2-50.2 portion of the band for gateways in favor of making more spectrum available for wireless. Yet a full gigahertz of spectrum in the 47 GHz band alone is already available for wireless under the *Second V-Band Order* in addition to the 10.85 GHz just made available for new licensed and unlicensed wireless in the *Report and Order*.⁵ O3b opposes opening the two gigahertz of spectrum in the 47 GHz Band in which FSS is primary for wireless use in a manner that would restrict FSS growth in the band. In particular, it is a matter of the highest public interest that FSS satellite operators retain primary spectrum for both uplinks and downlinks in the V-band.

O3b has consistently maintained that as long as FSS has sufficient mmWave spectrum available for primary FSS use, the physical characteristics of the mmWave bands are conducive to efficient inter-service sharing. Suitable sharing options include designating some bands as exclusive to FSS and other bands as shared with fixed/mobile on a co-primary basis, or by equitably designating discrete bands for FSS primary with fixed/mobile secondary, and fixed/mobile primary with FSS secondary.⁶ But any sharing scenario must enable FSS gateways to use the entire 47 GHz band, and must not preclude practical use of the 48.2-50.2 GHz portion of the band for other individually licensed FSS earth stations.

⁴ *Further Notice* ¶ 410.

⁵ *Id.* ¶ 376. An additional 17.7 GHz of spectrum is proposed to be made available for UMFUS in the instant proceeding.

⁶ The *Further Notice* describes a version of this proposal. *Further Notice* ¶ 414.

The sharing construct proposed in the *Further Notice* does not meet either of these criteria and is both unworkable and inequitable. Fixed satellite services bring a wealth of services to the marketplace. They are constantly innovating and extremely important to the nation's businesses, communications carriers, public safety communities, and individual consumers. Fixed satellite services also provide critical redundancy to terrestrial networks in the national communications infrastructure. The Commission must act in this proceeding to ensure access to at least the 48.2-50.2 GHz spectrum for primary FSS services in order to ensure the healthy maintenance and development of this critical infrastructure.

2. The 47.2-50.2 GHz Band Must Remain Available for Flexible Siting of Individually Licensed Earth Stations

FSS operators, including O3b, have had an expectation of using the 48.2-50.2 GHz band on a primary basis, as provided in the current U.S. Table of Allocations and discussed in the *First V-Band Order*, in addition to using the 47.2-48.2 GHz band for non-ubiquitously deployed, individually coordinated earth stations pursuant to the Commission's *Second V-Band Order*.⁷ For individually licensed earth stations operating throughout the 47.2-50.2 GHz band, the *Further Notice* proposes to adopt roughly the same FSS/UMFUS sharing framework adopted for the 28 GHz band. Under the proposal only one individually licensed FSS site per multi-county Partial Economic Area ("PEA") would be permitted as co-primary "subject to conditions and limitations" the Commission has adopted in other bands.⁸ In substance if not in name, this would

⁷ The FCC already prohibits FSS earth stations in the 47.2-48.2 GHz band that are ubiquitously deployed and those used to serve individual consumers. See *Second V-Band Order* ¶ 17 ("[W]e will not take any action here to undermine the basis of the consensus approach reached at WRC-2000 and any consideration for additional spectrum in the V-band for ubiquitous FSS operations will have to be done in a separate proceeding after a comprehensive record has been developed.").

⁸ *Report and Order* ¶ 412. Presumably, the "conditions and limitations" are those that apply in the 28 GHz band and the 37 GHz band.

treat fixed and mobile as having priority over, and even being primary to, FSS throughout the 47 GHz Band.

O3b opposes the Commission's plan to take the already too-restrictive rules adopted for gateways in the 28 GHz band and reduce the number of potentially authorized sites by a factor of 20.⁹ Doing so would remove some of the last important contiguous wideband spectrum available for primary FSS satellite services. This is also spectrum that has been identified for use by high-density applications in the Fixed-Satellite Service for countries in ITU Region 2.¹⁰ O3b and others have already proved that satellite systems can use the mmWave bands to provide innovative services that the market demands. In contrast, the use cases for terrestrial mmWave services are uncertain. And in any case, large amounts of mmWave spectrum are already available for UMFUS service. There is no public policy basis to eliminate the FSS primary allocation in this two gigahertz of spectrum in favor of creating additional, large UMFUS license areas for UMFUS. And it is not in the public interest to further limit individually licensed FSS earth stations to one per PEA. Further constraining FSS operations in the mmW bands would circumscribe FSS innovation and growth when demand for FSS services provided in the mmWave bands is growing rapidly.

As the *Report and Order* recognized, the 28 GHz siting rules are far more restrictive as applied to NGSO earth stations.¹¹ NGSO uplinks create a somewhat larger interference footprint than do GSO uplinks. This is an unavoidable feature of lower altitude satellite systems

⁹ The *Report and Order* authorizes a maximum of three sites in each of the 3,143 U.S. counties. *Report and Order* ¶ 54. The *Further Notice* proposes to permit just one FSS gateway site in each of the 416 Partial Economic Areas. *Further Notice* ¶ 412. The restrictions on siting of FSS earth stations are severely overbroad and even more so when applied to NGSO earth stations. O3b expects to address these restrictions more fully upon publication of the *Report and Order*.

¹⁰ See 47 C.F.R. § 2.106 n. 5.516B.

¹¹ *Report and Order* ¶ 46 (“We recognize that sharing may be more difficult for non-geostationary satellite systems, such as the system operated by O3b”).

engineered to provide low latency service. But the NGSO footprint is still small in absolute terms. Accommodating the unique footprint of NGSO uplinks is a trivial policy tradeoff compared to the remarkable capability O3b provides: delivering fiber-like capacity virtually anywhere within its system footprint and even to moving platforms. The Commission should not repeat the mistake of adopting earth station siting rules that do not account for the unique needs of NGSO systems.

Neither should the Commission re-designate the 48.2-50.2 band on the assumption that only FSS consumer-class terminals would be deployed there. O3b's long range planning has relied on the availability of a contiguous three gigahertz of spectrum in the 47 GHz Band for gateways. And even O3b's non-gateway earth stations cannot operate on a secondary basis or subject to onerous conditions. O3b does not offer consumer-class service and does not at this time envision deploying earth stations ubiquitously in the 47 GHz Band. O3b's customer terminals are very high throughput carrier/enterprise facilities designed to allow governments, telcos, and enterprises to access fiber-like capacity. O3b expects that most or all of its operations in the 47 GHz Band will be with individually licensed earth stations, whether for gateway-like operations or to support customer operations.

The new restrictions on FSS adopted in the *Report and Order* have made the 47 GHz Band more important than ever to FSS growth. Moreover, If the Commission does authorize fixed and mobile service in 48.2-50.2 GHz band it should clarify that FSS gateways (and other individually licensed FSS earth stations) remain primary (or co-primary) and are not subject to the siting restrictions adopted for other bands.

3. Licensing FSS User Terminals in the 48.2-50.2 GHz Band

The *Further Notice* seeks comment on three approaches to accommodate FSS user earth stations in the 48.2-50.2 GHz band should primary fixed and mobile licenses be authorized as

proposed. The first relies on a Spectrum Access System (“SAS”) that FSS terminals would use “to determine whether their user equipment could transmit without causing interference to terrestrial operations.”¹² This approach treats FSS user terminals as opportunistic users of the spectrum and is unworkable. As discussed above O3b’s customers – enterprises and carriers – will not be able to rely on O3b’s service if it is only available occasionally, for unpredictable periods of time, and subject to being displaced altogether.

The *Further Notice*’s second proposed approach for shared access – band segmentation – is more promising. Under this approach each service would, in effect, have primary status in a portion of the band and secondary status in the remainder of the band.¹³ O3b supports this as a workable approach. The Commission should preserve the segmentation that exists today. FSS is and should (at minimum) remain primary for both gateways and other individually licensed terminals in 48.2-50.2 GHz portion of the band. Subject to appropriate conditions (including controlling aggregate interference to satellites), UMFUS service might be permitted to operate on a secondary basis. FSS gateways should be permitted in the 47.2-48.2 GHz portion of the band, as they are under the existing rules, without additional siting restrictions.

As an alternative to a SAS, the *Further Notice* seeks comment on the possibility of developing specific criteria for assigning priority between FSS and terrestrial operations. Depending on specifics this might be a workable solution. The *Further Notice* suggests that FSS and UMFUS operators could register their operations in a database and interference protection could be assigned on a first-come, first served basis.¹⁴ O3b recommended a similar approach in

¹² See *Further Notice* ¶ 413.

¹³ See *Further Notice* ¶ 414.

¹⁴ See *Further Notice* ¶ 415.

its comments in response to the *Notice of Proposed Rulemaking*.¹⁵ First-come first-served is an effective and spectrum-efficient approach for mixed-use bands characterized by short-range terrestrial propagation, so long as FSS has some spectrum in the band also available for exclusive FSS use and FSS satellites are protected from interference caused by terrestrial operations.

B. Performance Requirements and Sharing Mechanisms

1. Additional Performance Metrics

The *Further Notice* seeks comment on “additional” performance metrics for certain services, such as the Internet of Things and machine-to-machine communications, that might be provided by UMFUS licensees. It posits that additional metrics would “better accommodate” UMFUS development and further new mmWave services while still fulfilling the Commission’s statutory obligation to encourage productive use of spectrum and avoid warehousing and speculation.¹⁶

O3b urges the Commission not to increase the long menu of different types of performance criteria, any of which, or any combination of which, an UMFUS licensee might selectively adopt to perfect its exclusive rights with minimal service actually provided. The Commission should discourage warehousing and speculation, and by statute, it must ensure that spectrum is actually used in the public interest.¹⁷ Performance requirements should create strong incentives for substantial deployment of actual service across a significant portion of the exclusively licensed territories.

Given the propagation characteristics of the mmWave bands, the efficacy of performance requirements must be measured on the amount of licensed spectrum and geographic area an

¹⁵ See Comments of O3b Limited, GN Docket No. 14-177 at pp 20-25 (filed Jan. 28, 2016) (“O3b Comments”).

¹⁶ *Report and Order* ¶ 465.

¹⁷ See generally 47 U.S.C. § 309.

UMFUS licensee leaves unused, and not by the amount of service an UMFUS licensee provides in geographic areas where the spectrum is used. Regardless of the number of base stations built or “the number of devices connected, volume of data transmitted, or number of sessions initiated on the network,” it is nearly certain that mmWave spectrum will remain unused by a terrestrial licensee in large geographic areas.¹⁸ Under these circumstances, the right to exclude should be narrowly drawn and temporally limited. Licensees that do not provide service across a significant portion of the exclusively licensed service area by the end of the first license term should forfeit their right to exclude others from providing service.

2. Sharing Mechanisms

The *Further Notice* seeks further comment on the possibility of implementing a use-or-share regime in the UMFUS bands, discusses a variety of opportunistic sharing mechanisms, and reiterates the Commission’s belief that a use-or-share regime may have the potential to enhance the efficiency and productivity of spectrum, if properly implemented.¹⁹

Implicit in the *Further Notice*’s proposals for a use-or-share regime is the understanding that purely binary performance requirements may be inappropriate given the mmWave bands’ propagation characteristics.²⁰ If performance does not meet a reasonable threshold, loss of the entire licensed area is appropriate. On the other hand, a licensee might make significant investments to provide service in dense urban areas comprising less than a tenth of the geography of a county or PEA, but make little or no use of its exclusively licensed spectrum elsewhere. In those cases, it may be inequitable for the Commission to reclaim the entire license area. But the unused areas should be available for productive use by others. O3b submits its

¹⁸ *Report and Order* ¶ 467.

¹⁹ *Report and Order* ¶¶ 474-75 (emphasis added).

²⁰ O3b previously argued, and continues to believe, that those characteristics make the mmWave bands poor candidates for large, exclusively licensed territories. See O3b Comments at 7-10.

comments below on the best approaches to allowing others to provide service in areas in which the incumbent licensee does not.

a. A “Keep What You Use” (or “Use or Lose”) Approach Should Not Be Quickly Dismissed

The question is not whether but how the Commission can best ensure that mmWave band services are made available in areas in which the original licensee does not serve. The *Further Notice* introduces and immediately dismisses the “keep what you use” construct, under the assumption that spectrum revoked would need to be re-auctioned. The *Further Notice* posits that re-auctioning would be administratively burdensome and time-consuming.²¹

But license areas that are forfeited need not be (and should not be) re-auctioned as exclusive geographic licenses. A dearth of terrestrial deployment after a decade of exclusive rights is a strong signal that the license area, or large portions of it, cannot support sufficient investment to justify ongoing exclusive wireless rights to that area. This is particularly true in light of the Commission’s secondary markets rules, which reduce barriers to entry and facilitate use of spectrum by others than the licensee itself. Reclaiming and then re-licensing unused areas under the same rules would simply perpetuate a right-to-exclude policy that has failed to result in service to the public.

Instead, those areas should be reclaimed and made available for licensing to others seeking to offer authorized services on a first-come basis.²² This would allow willing operators of any allocated and authorized services to launch service when and where the spectrum can be

²¹ *Report and Order* ¶ 476.

²² O3b incorporates by reference its proposals for the “keep-what-you-use” or “use-or-lose” approach to UMFUS performance requirements, and an applicable first-come licensing mechanism as described in its comments on the NPRM. *See* O3b Comments at 20-25. O3b explained that the limited propagation of the mmWave bands makes them excellent candidates for first come, facilities-based licensing. A first-come approach for areas forfeited for lack of service would eliminate the risk of further warehousing while ensuring that the spectrum is available to those willing to invest in providing service. The Commission has decades of experience with first-come licensing and the approach is authorized by the Communications Act. *See* 47 U.S.C. §§ 309(j)(1), (j)(6)(E).

used productively, without waiting for the Commission to re-auction spectrum that is unlikely to generate much revenue. UMFUS license areas that are not purchased in the auction, as well as those forfeited entirely for failure to meet performance requirements, should also be opened for first-come access. In both cases, it would be clear that exclusive geographic licensing has been ineffective in fostering service to the public in those areas.

Forfeiture of a portion of the licensed area would not have a significant adverse impact on a licensee that is not using the area. The licensee would still be free to deploy on a first-come basis. It would merely forfeit the right to continue to exclude other productive uses of the spectrum in areas the licensee has not found useful to its business. As provided by the Communications Act, mutually exclusive first-come applications, if any, would be resolved by auction, providing a market-based mechanism to determine the highest and best use. Indeed, the original licensee would have better access to the forfeited areas under a first-come approach than it would if the forfeited areas were won by a different bidder when re-auctioned.

We urge the Commission to consider “keep what you use” as a simpler and more effective approach to mitigate the problems with binary performance requirements in the mmWave bands.²³

²³ The *Further Notice* asks whether the Commission should set a level, such as 40% of a census tract, at which a subdivision of a license area would be declared to be “used” in its entirety. *Further Notice* ¶ 481. Given the limited propagation of the mmWave bands in terrestrial applications, permitting an UMFUS licensee to arbitrarily obtain the whole of a census tract that is only partially used will lead to anomalies and inefficiencies. An UMFUS licensee may have no need to expand further into a census tract, but a great need to expand into an adjacent but to-date unused tract. The licensee should have reasonable flexibility to expand based on its needs, but not permitted to retain exclusive access to areas it does not need. If the Commission does establish a threshold at which an entire census tract or other subdivision is deemed to be used, that the area should be granular (no larger than a census tract) and the threshold should be at least 80% actual use.

b. FSS Should Be Permitted to Access Geographic Areas Where UMFUS Does Not Use 28 GHz Band Under Use-or-Share or Use-or-Lose

While O3b believes use-or-lose is the better approach to ensuring unused spectrum and geographic areas of UMFUS exclusive territories are eventually made available for productive use (and is most consistent with the Commission's statutory obligations), a properly implemented use-or-share regime could provide many of the same benefits.²⁴ If an UMFUS licensee fails to meet a performance requirement, or at any other time in the license term when it becomes apparent that an UMFUS licensee cannot meet a performance requirement, the Commission should accept applications for protected FSS earth stations in that license area, so long as those earth stations would not cause harmful interference to operational UMFUS facilities in the license area. The *Further Notice* acknowledges that the propagation characteristics of the mmWave bands are conducive to sharing between UMFUS and FSS,²⁵ and the recently revised 28 GHz rule framework contemplates sharing between UMFUS licensees and FSS earth stations.²⁶ Moreover, the market has already validated the need for and value of services provided by FSS satellite systems.

FSS earth stations deployed under a use-or-share regime should have the same protected status as grandfathered 28 GHz earth stations and those deployed pursuant to new rule 25.136(a). Once built, a 28 GHz earth station should not be required to modify or cease operations for the benefit of future UMFUS expansion or for any other operations authorized in the band. Protected status is the *sine qua non* of FSS earth station deployment: satellite operators and customers cannot reasonably be expected to invest in and rely on earth stations if a third party can later move into the area and force the earth station to shut down operations. Individually

²⁵ See *Report and Order* ¶ 369.

²⁶ See *Report and Order* ¶¶ 43-47.

licensed, coordinated earth stations fit neatly and seamlessly into a use-or-share or use-or lose paradigm.

c. “Use” for Use-or-Share or Use-or-Lose Should Be Defined by Contours Around Deployed Facilities

The *Further Notice* asks how the Commission should define a licensee’s “use” of its service area for purposes of use-or-share access.²⁷ O3b believes “use” should be defined based on actual existence of operational UMFUS services within a given area. UMFUS licensees should also be entitled to protection within a limited expansion zone or contour around existing operational UMFUS facilities. The expansion contour should be objectively defined and proportional to a licensee’s actual use in a given area. For example, the zone of expansion around a small, isolated deployment should be much smaller than the zone surrounding a dense, contiguous urban deployment. Rules should anticipate and deter manipulation (e.g., daisy-chaining minimal deployments in order to warehouse a larger area). All other areas should be available for access by FSS operators on the use-or-share basis O3b describes in these comments.

d. Traditional Frequency Coordination is the Best Approach for Licensed Use-or-Share Access

A use-or-share regime requires rules and procedures to facilitate access to unused areas without causing harmful interference to protected facilities after the initial period afforded to an UMFUS licensee for building out its network. Traditional frequency coordination is clearly the best approach, having been used and refined over the last few decades. Locations of protected facilities should be available in a publicly accessible database. Initially, these protected facilities will be limited to UMFUS deployments and FSS earth stations.²⁸ FSS earth station parameters

²⁷ *Report & Order* ¶ 481.

²⁸ See Section f. below addressing non-UMFUS use of the 28 GHz band.

are already publicly available. UMFUS operators should also provide information about actual contours so that prospective new users can know what facilities and expansion zones must be protected.²⁹ Should the Commission determine that it is too burdensome for UMFUS operators to also share deployment information, prospective users should be able to obtain the necessary information, perhaps subject to an obligation to keep the information confidential, to determine if their proposed facilities can be built.

Coordination rules should ensure that UMFUS licensees cannot unfairly block FSS earth stations from operating in unused portions of the UMFUS license area. Any proposed new facilities that exceed a coordination trigger level (to be determined) would be subject to coordination in which all impacted parties are obligated to provide accurate information and coordinate in good faith, with recourse to the Commission where necessary to resolve coordination in a timely manner. If non-UMFUS/non-FSS services are authorized and licensed, those services should be required both to complete coordination before construction and to continue to protect the higher status UMFUS and FSS licensees after construction.

e. The Commission Should Not Consider Authorizing Additional Terrestrial Use of the 28 GHz Band Until Interference from UMFUS to FSS Satellites Has Been Studied and is Understood

The *NPRM* record reflects the extensive concern of FSS operators that UMFUS operations are likely to cause harmful interference to existing and future FSS satellites unless steps are taken to control aggregate skyward emissions from all UMFUS operations.³⁰ The *Report and Order* found insufficient evidence that harmful aggregate interference to satellites

²⁹ For example, the location of the base station combined with the maximum cell diameter and a protection criteria at the edge of the cell would enable FSS users to identify and protect mobile UMFU deployments when planning new earth stations. Similarly, location information combined with pointing direction and antenna beam width would be sufficient to allow FSS operators to deploy operations without causing harmful interference to fixed UMFU deployments.

³⁰ *Report and Order* ¶¶ 288-96.

could occur from UMFUS operations, but directed the staff to open a separate docket to receive additional evidence and reserved the right to revisit the issue.³¹

The Commission's determination that harmful interference to FSS satellites is unlikely to occur was based on the projected characteristics of UMFUS operations as described in the record.³² Interference from additional services was not considered in the determination. It is therefore premature for the Commission to consider authorizing licensed or unlicensed non-UMFUS/non-FSS services in the 28 GHz band, when the impact of recently authorized mobile service on in-orbit satellite receivers has not been assessed. The Commission should defer any consideration of authorizing other uses of the 28 GHz band until the additional data and studies have been prepared, submitted in the new docket, and reviewed by stakeholders.

The *Further Notice* acknowledges that any additional use of the 28 GHz band must account for and protect licensed UMFUS operations,³³ but overlooks the equal necessity that any additional users must also protect FSS operations. By long-established Commission policy and rules, FSS is treated as secondary to LMDS (now UMFUS), but retains express priority over all other services authorized in the 28 GHz band.³⁴ The aggregate impact of UMFUS on 28 GHz FSS uplinks must be thoroughly understood before other emissions are authorized.

³¹ *Report and Order* ¶ 69.

³² *Id.* ¶ 65 (“ . . . [T]he record in this proceeding does not demonstrate *that the rules that we adopt today* [authorizing mobile] would significantly risk harmful interference to satellite operations”) (emphasis added).

³³ *Report and Order* ¶ 54.

³⁴ See *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services*, CC Docket No. 92-297, First Report and Order, 11 FCC Rcd 19005, 19024 ¶¶ 42-44 (1996) (“*First Ka-Band Report and Order*”) (“Lower-case letters indicate services in a particular band segment which also have licensing priority vis-a-vis any third service allocated domestically or internationally in the band, but have no licensing priority over the service in capital letters in the band segment and must operate on a non-interference basis and must accept interference vis-a-vis that service. FSS is in lower case and the only service in capital letters is LMDS, which now incorporates UMFUS but presumably not use-or-share or future unlicensed terrestrial services.”).

f. FSS Must Have Licensing Priority Over All Non-UMFUS Users in the 28 GHz Band and Those Users May Not Cause or Increase Interference to FSS Satellites

The *Further Notice* asks about implementing unlicensed services in mmWave bands.³⁵ It is premature to introduce such services in bands shared with satellite services until the impact of the aggregate interference on satellite receivers is assessed and understood. The *Report & Order* rejected the arguments of O3b and other satellite operators that the Commission's *First Ka-band Report and Order*³⁶ assigned priority to 28 GHz FSS operations over future mobile service in the band.³⁷ The Commission instead concluded that LMDS as originally authorized contemplated mobile operations, and that mobile operations by LMDS licensees are therefore not a "third" service over which FSS has priority.³⁸ The *Report and Order* extended the LMDS priority over FSS to the UMFUS successor licensees for licensed fixed and mobile operations in 28 GHz. But the Commission was also clear that in doing so it was "maintain[ing] the current status of FSS."³⁹ FSS thus continues to have licensing priority over other new services authorized in the 28 GHz band, whether licensed or unlicensed.

O3b designed, built and now operates its global, low-latency high-throughput system in reliance on the international FSS co-primary allocation in the 28 GHz band and in reliance on the Commission's decision to give priority to FSS over all services other than LMDS (now UMFUS) in the 28 GHz band. Having invested billions based on a regulatory regime that had been stable for twenty years, O3b is entitled to expect (and its customers are entitled to expect) that the Commission will not change that environment in a way that undermines O3b's investment or

³⁵ *Report & Order* ¶ 480.

³⁶ See *First Ka-Band Report and Order* ¶ 44.

³⁷ *Report and Order* ¶¶ 62-63.

³⁸ *Id.*

³⁹ *Report and Order* ¶ 50.

threatens its service. Use of the 28 GHz band for new services by new licensees or for unlicensed service would radically change the regulatory environment and could adversely impact 28 GHz FSS operators, including O3b, in ways that could not possibly have been foreseen.

O3b does not categorically oppose any other use of the 28 GHz band. But the suitability of services other than UMFUS or FSS cannot be evaluated until the interference environment for UMFUS itself is better understood. Should the Commission ultimately decide to authorize services other than UMFUS and FSS in the 28 GHz band, O3b urges the Commission to adhere to two principles.

First, all FSS earth stations, including those deployed under use or share rules, must have priority over any other non-UMFUS licensed or unlicensed services the Commission may also authorize.

Second, non-UMFUS terrestrial operations must be subject to an absolute obligation to cease transmissions immediately in any area in which an FSS uplink beam is degraded by interference from terrestrial emissions. Because it may be impossible for an FSS operator (or an UMFUS licensee) to determine the specific cause (or causes) of interference, all “third-service” terrestrial emitters should be subject to a strict obligation to modify or cease 28 GHz transmissions immediately following an interference event. Rules permitting other uses must require procedures (and facilitate use of sophisticated tools) to determine the location and technical parameters⁴⁰ of all 28 GHz operations, along with effective enforcement mechanisms. Ideally, unlicensed use should be indoor only. Should the Commission permit outdoor unlicensed deployment, the location and technical parameters of all outdoor emitters should be

⁴⁰ For example, detailed antenna gain patterns and EIRP masks would provide FSS operators with information to analyze what level of additional deployment might be possible without the threat of harmful interference towards satellites.

registered in a database that is accessible to FSS and UMFUS licensees. Any outdoor transmitters should adhere to strict technical rules, including power and downtilt, and be subject to immediate shut down by a database administrator if any UMFUS or FSS operator complains of interference that is or might be caused by the emitter.

3. Use or Share Is Not a Substitute for Effective Performance Requirements

Finally, we respond to paragraph 474 of the *Further Notice*, in which the Commission asks whether use-or-share rules might be adopted in lieu of performance requirements. They should not. The Commission does not have authority to award exclusive geographic licenses that do not impose obligations on the licensee to ensure that the spectrum is used to provide service.⁴¹ If most or all of the spectrum eventually became available for shared use because the licensee did not use it at all, the Commission would have granted exclusive rights – including the right to preclude FSS earth stations – for a period of time without any obligation of the licensee to make use of the spectrum. This would essentially authorize a licensee to determine which other parties may access the spectrum, without any obligation to itself build out and put the spectrum to use.

⁴¹ See generally 47 U.S.C. §§ 309(j)(3) & 309(j)(4)(b).

III. CONCLUSION

The Commission should preserve the segmentation of the 47 GHz Band that exists today. FSS should remain primary for both gateways and (at minimum) other individually licensed terminals in 48.2-50.2 GHz portion of the band. Subject to appropriate conditions (including controlling aggregate interference to satellites), UMFUS service might be permitted to operate on a secondary basis. FSS gateways should continue to be permitted in the 47.2-48.2 GHz portion of the band, as they are under the existing rules, without additional siting restrictions.

O3b supports adoption of a use-or-share condition on UMFUS licenses. Use-or-share access should be restricted to FSS use unless and until it has been determined that other uses will not contribute to aggregate interference to FSS satellites. If other uses are authorized they should be secondary to FSS operations in all respects.

Respectfully submitted,

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